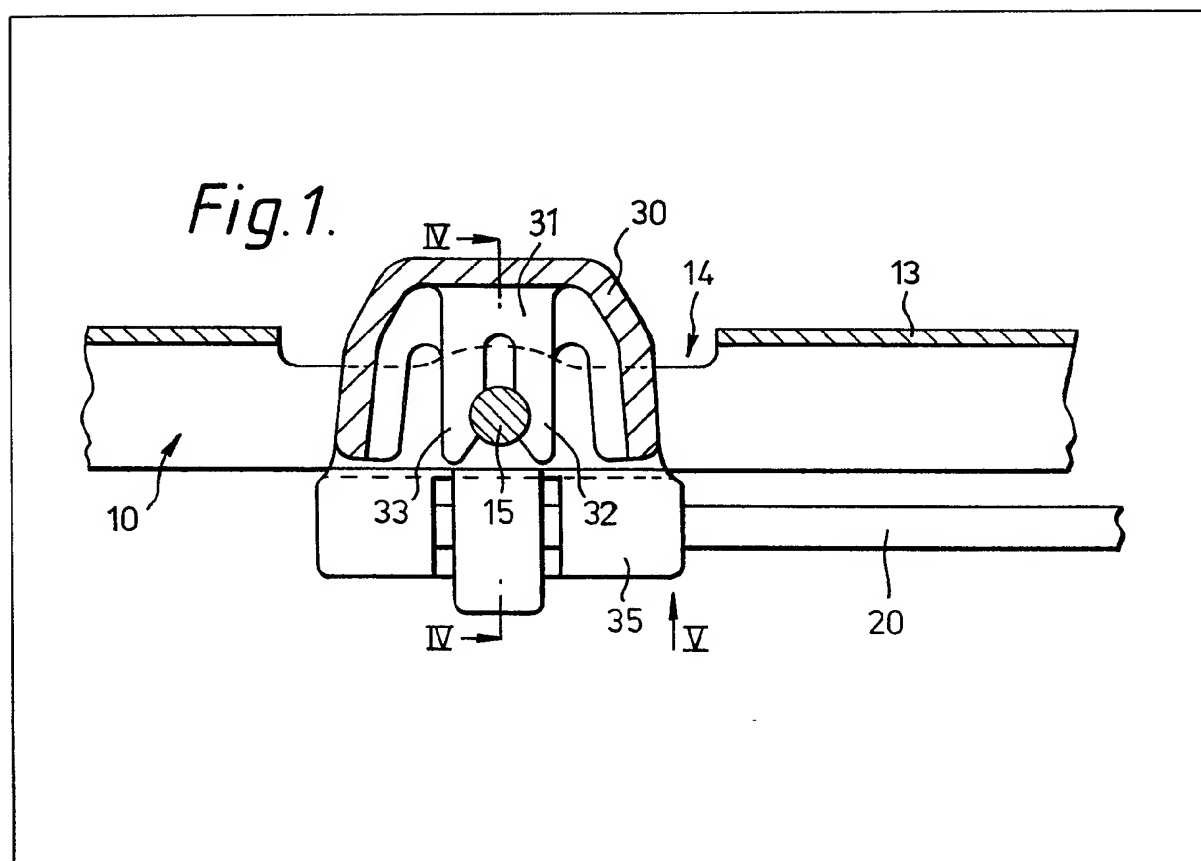


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(54) **Windscreen wiper**

(57) A windscreen wiper assembly comprising a main yoke (10) having a substantially U-shaped cross-section and a pin (15) secured between sidewalls, in the region of an aperture (14) in the back (13) of the yoke (10), is provided with a connecting element (30) which serves to swivellably mount wiper arm (20) to the main yoke (10) and has an adapter member (35) for the wiper arm (20) arranged laterally beside the pin (15). In modifications, the connecting element may be non-pivotably attached to the pin and the adapter member may be in the form of a laterally-projecting profiled pin.



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Fig. 1.

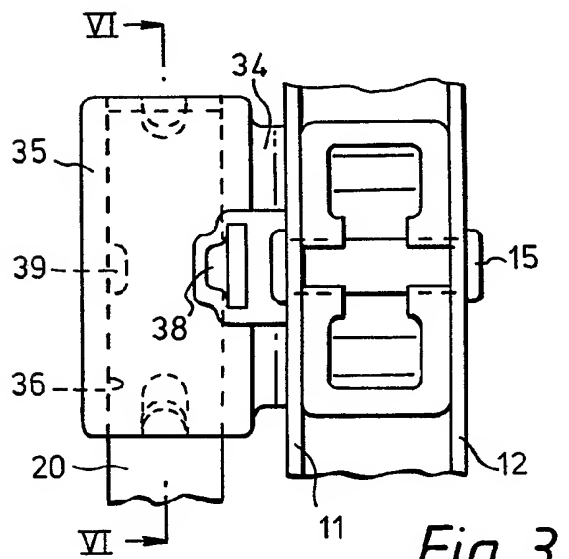
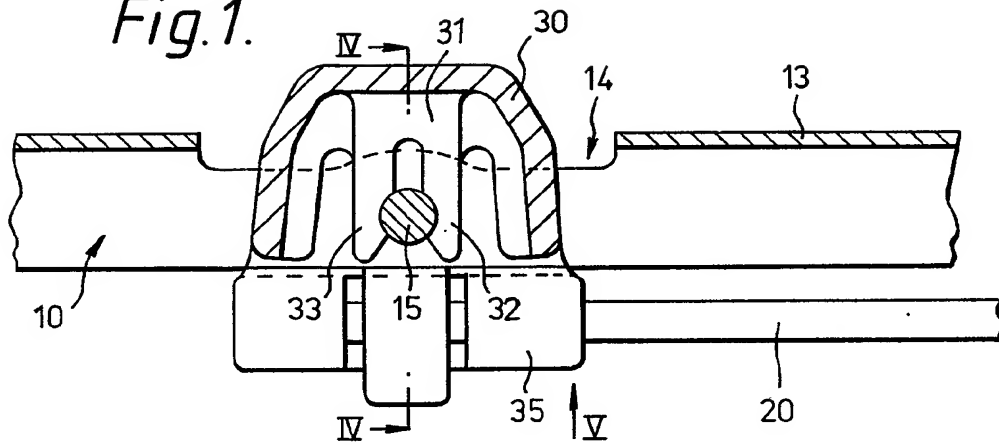


Fig. 3.

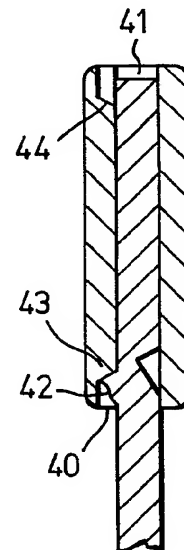


Fig. 4.

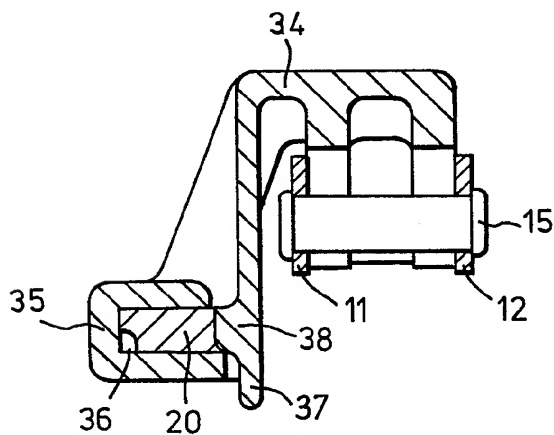


Fig. 2.

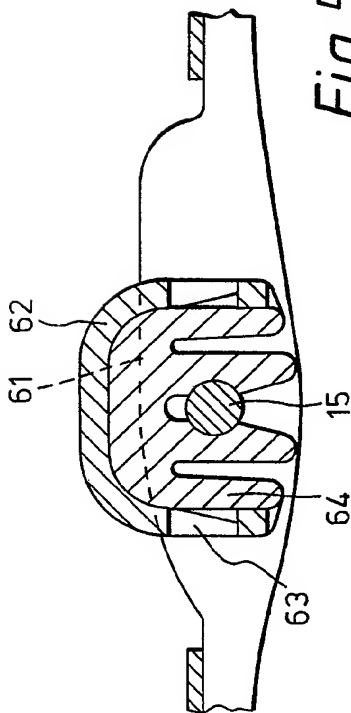


Fig. 5.

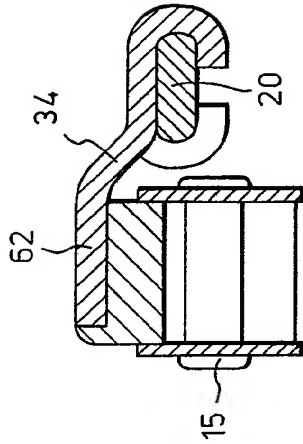


Fig. 6.

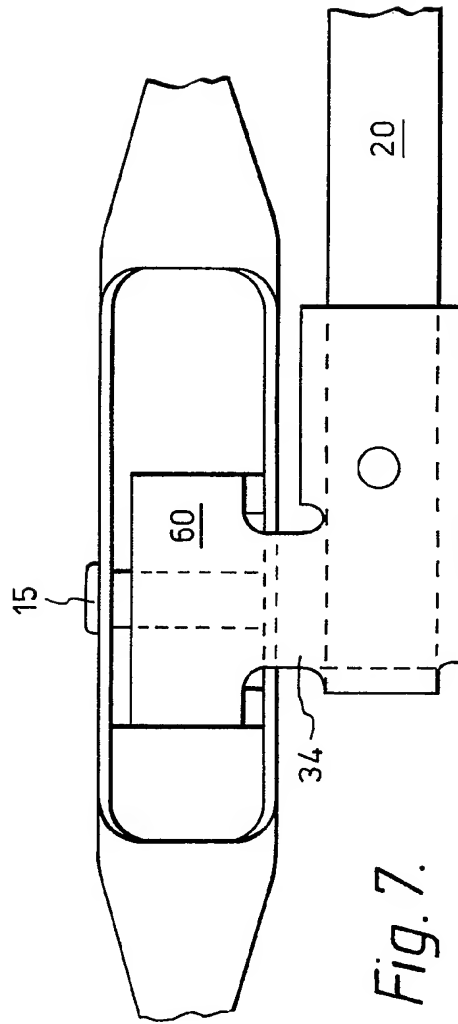
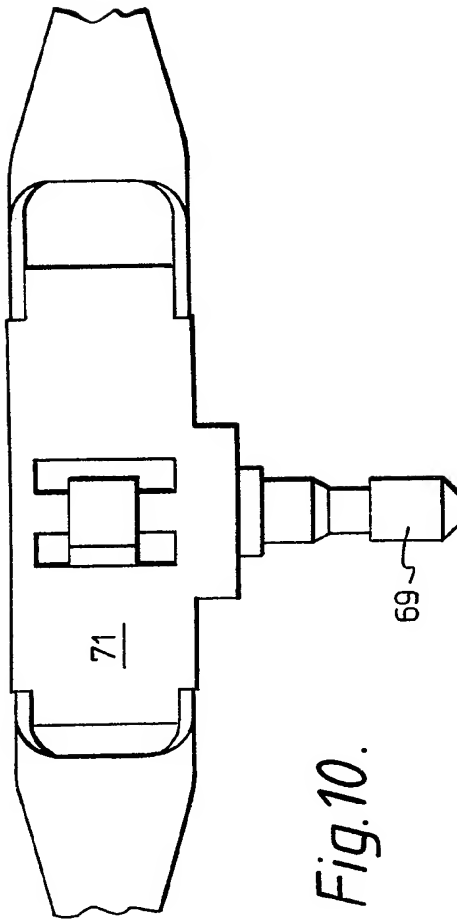
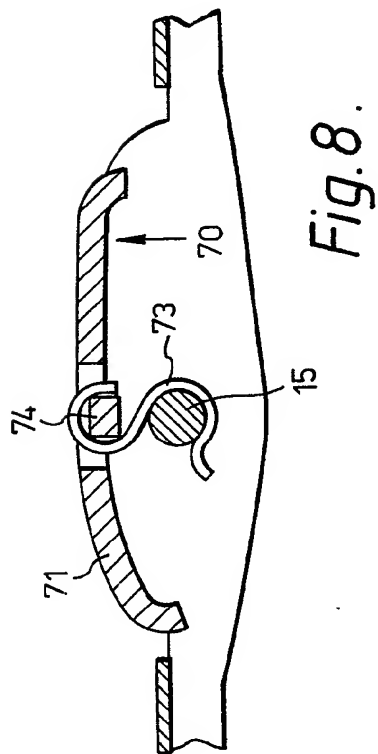
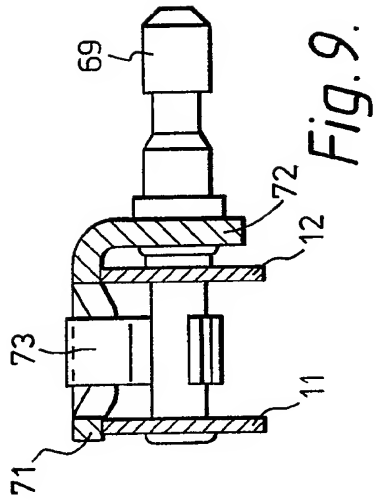
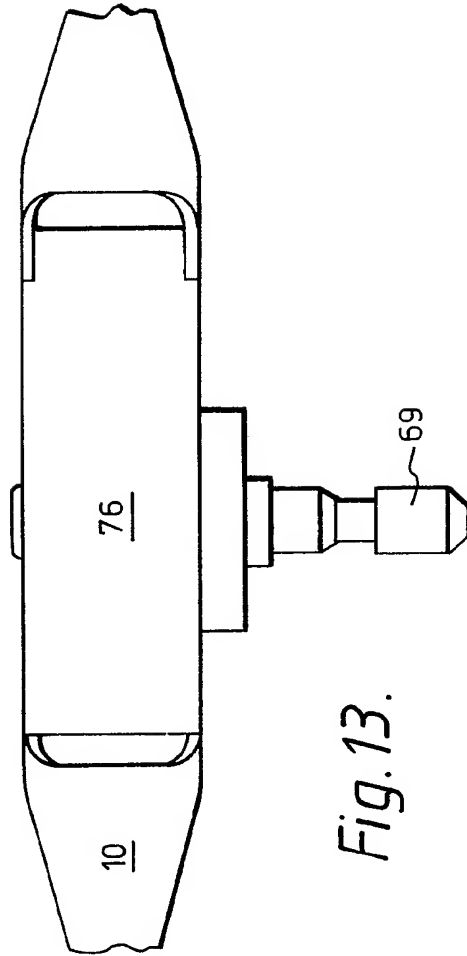
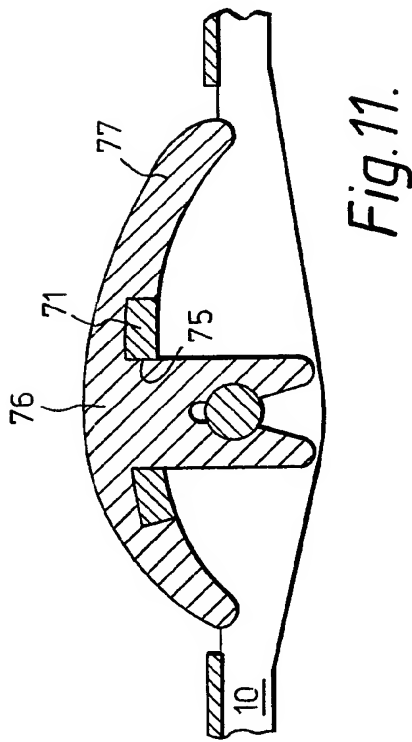
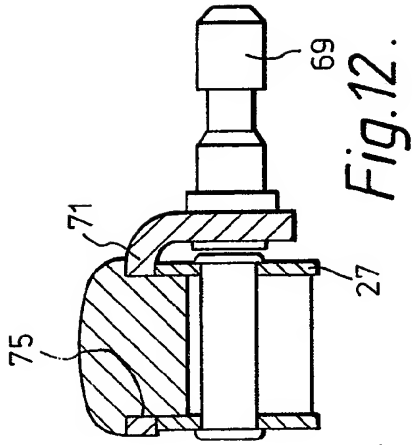


Fig. 7.





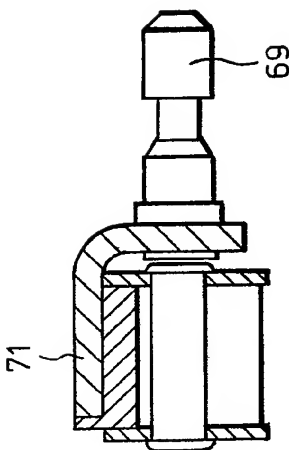


Fig. 15.

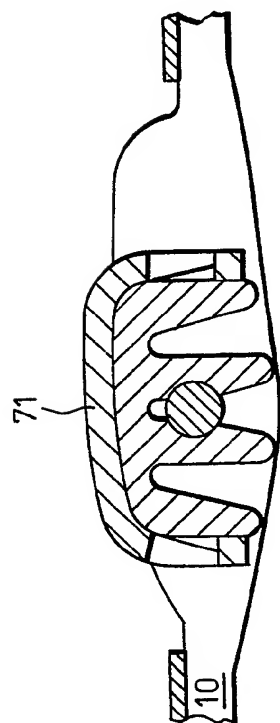


Fig. 14.

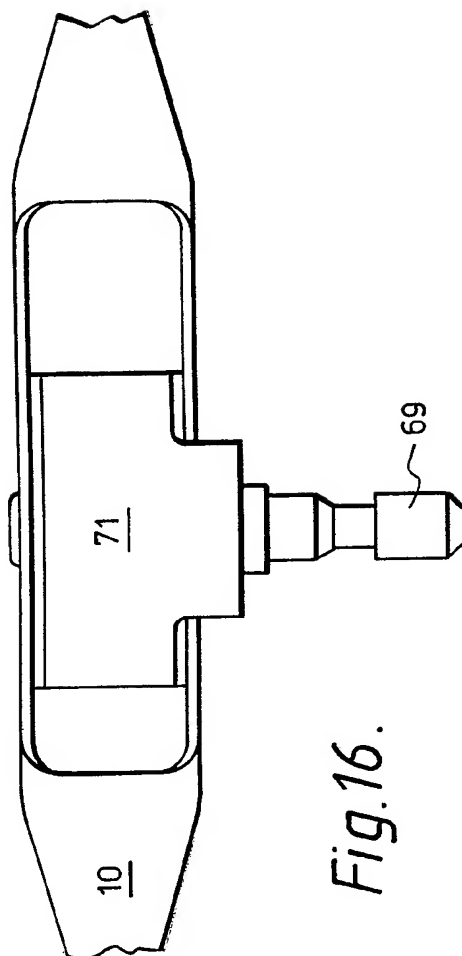


Fig. 16.

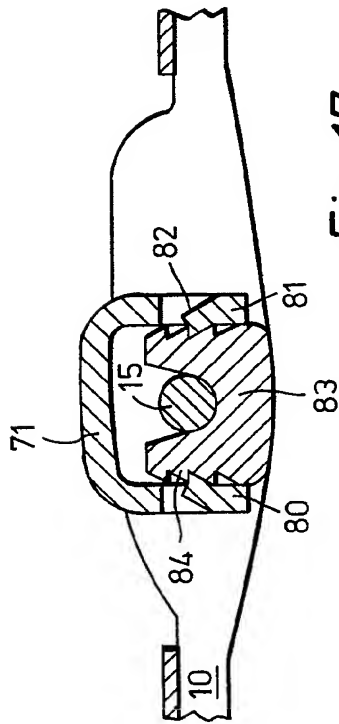


Fig. 17.

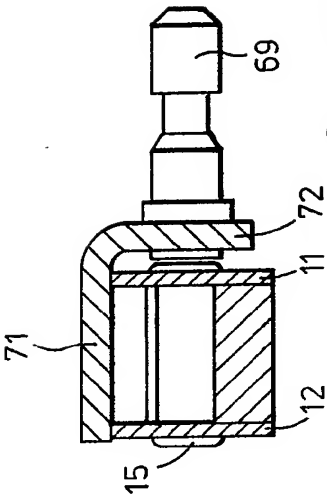


Fig. 18.

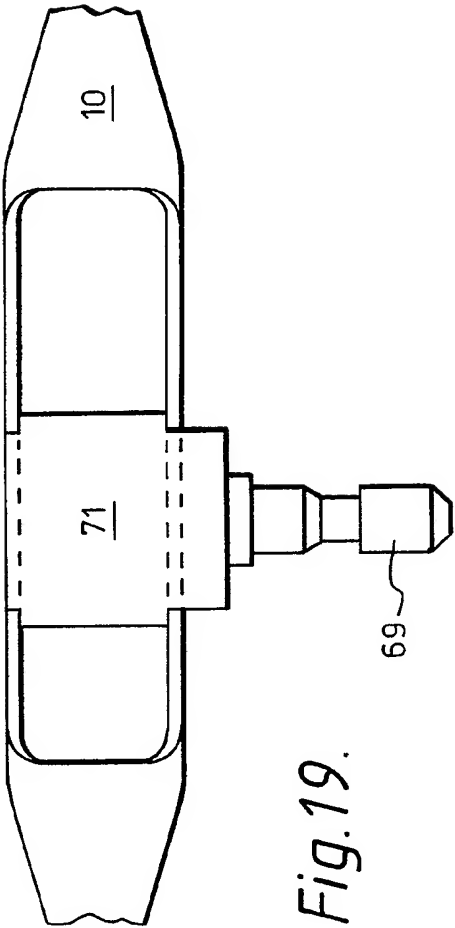


Fig. 19.

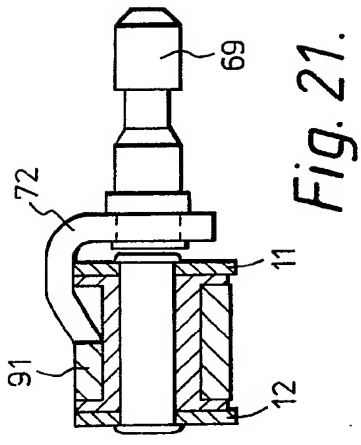


Fig. 21.

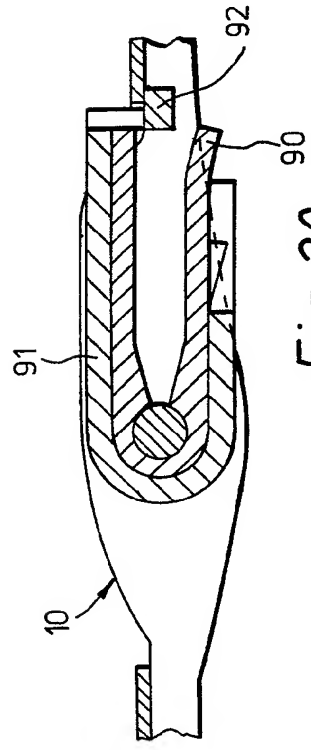


Fig. 20.

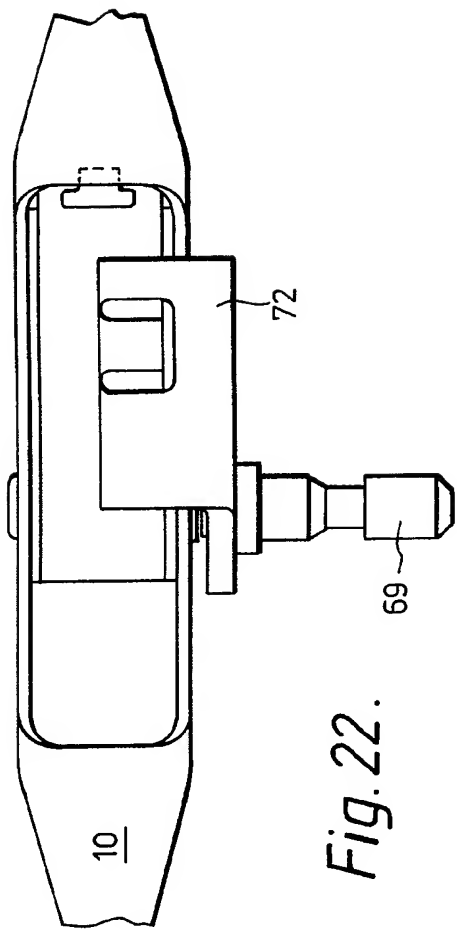


Fig. 22.

SPECIFICATION

Windscreen wiper

5 The invention relates to a windscreen wiper.

In the majority of the windscreen wipers normally used today the wiper arm is locked with a connecting member which is itself mounted to be swivelled on a pivot pin secured between side walls of the main yoke. In these arrangements the wiper arm is located above the yoke system of the wiper blade. The advantage of these arrangements with a central attachment is that the pitching and twisting moments of the wiper blade are reliably controlled, because the guide between arm and blade is relatively long and stable.

In addition windscreen wipers are known the wiper arm of which is fastened on a profiled pin projecting laterally from the wiper blade. In these arrangements the wiper arm is extending laterally of the wiper blade in a plane imagined to extend through the axis of the pin in the longitudinal direction of the wiper blade. These arrangements primarily are preferred because of stylistic reasons, they can, however, especially at high driving speeds, be of advantage because of their low overall height, because they are not removed so easily from the pane to be cleaned. Due to the lateral articulation of the wiper blade on the wiper arm these arrangements are, however, disadvantageous with respect to stability.

The invention is thus based on the problem of creating a windscreen wiper which combines the advantages of the two above arrangements without having their disadvantages.

According to the present invention there is provided a windscreen wiper including a wiper arm, a wiper blade with a main yoke and a connecting element between the wiper arm and the wiper blade, the yoke having a substantially U-shaped cross-section and a first pin, secured between sidewalls thereof in the vicinity of an aperture in the back of the main yoke, to which a connecting element for a wiper arm is mounted, characterised in that the connecting element projects through the aperture in the back of the main yoke and has an adapter member for the wiper arm arranged laterally beside the first pin.

Embodiments of the invention will now be described with reference to the accompanying drawings, in which

Fig. 1 is a longitudinal section through an embodiment with an angularly movable suspended connecting element;

Fig. 2 is a section taken on the line IV-IV of Fig. 1;

Fig. 3 is a view in direction of arrow V of Fig. 1;

Fig. 4 is a section taken on the line VI-VI of Fig. 3;

Figs. 5 to 7 are sections and a view of a further embodiment and

Figs. 8 to 22 are two sections and a view each of five embodiments of connecting element rigidly secured to a wiper blade.

The windscreen wiper shown in Figs. 1 to 4 consists of a wiper blade (not shown in detail) with a conventional main yoke 10 having two parallel side walls 11 and 12 and a back 13 with an aperture 14. In the area of the aperture 14 a pin 15 (pivot pin) is secured between the side walls 11 and 12.

A connecting element 30 consists of a locking element 31 with two clip-shaped legs 32 and 33, a web 30 overlapping the side wall 11 of the main yoke and an adapter member 35 with an insertion channel 36 for a wiper arm 20 with a straight end. The connecting element 30 is locked for swivelling on the pivot pin 15.

One wall 37 of the insertion channel 36 is resilient and has a cam 38 which can engage laterally with a recess 39 on the wiper arm 20. Thus the wiper arm 20 is rigidly locked with the adapter member 35.

As especially Fig. 4 shows the insertion channel 36 is provided with openings 40 and 41 on both sides, so that the connecting element 30 can be used for wiper blades to be articulated to the left side of the wiper arm as well as those to be articulated to the right side of the wiper arm.

The wiper arm 20 has an embossed projection 42 co-operating with stops 43 and 44 in such a way that insertion of the wiper arm 20 in the insertion channel 36 is limited. The adapter portion 35 is arranged laterally of the pivot pin 15.

The portions comprising the connecting element 30 are angled sideways and downwards relative to one another in such a way that in spite of the central attachment between the side walls of the main yoke the wiper arm extends laterally to the wiper blade and – as Fig. 4 shows – below an imagined swept plane through the pivot pin axis. Of course the locking connection between the connecting element and the pivot pin as well as the connection between the adapter member and the wiper arm can be modified as required. For instance the adapter portion could be suitable to articulate a hooked wiper arm.

The Figs. 5 to 7 show an alternative according to the same principle in which in fact the connecting element is partly made of metal on grounds of stability. Over a plastics member 61 locked on the pivot pin 15 a yoke 62 is slipped, the side walls of which are provided with recesses 63 into which locking cams 64 of the plastics member 61 engage. The yoke 62 at a spacing extends over the one side wall 11 of the main yoke 10 and then ends in an adapter member for the purpose of locking with the wiper arm 20.

The Figs. 8 to 22 show embodiments in which the connecting element is unmovably held between the side walls 11 and 12 of the main yoke, whereby the pin 15 is used for the attachment but not pivoting. The connecting element has a laterally projecting profiled pin 69 for the purpose of swivellably putting a corresponding designed wiper arm on it. Thus these embodiments include the advantage that standard wiper blades can be articulated to standard wiper arms having another fastening principle via suitable connecting elements centrally secured bet-

ween the side walls of the main yoke.

In the embodiment according to Figs. 8 to 10 the connecting element 70 consists of a sheet metal angle element one leg 71 of which on both sides rests upon the front edges of the side walls 11 and 12 of the main yoke 10. On the other leg 72 the profiled pin 69 is riveted. An S-shaped spring 73 is supported on a web 74 of the leg 71 and on the pin 15 and serves as a locking element between the connecting element and the pin 15.

In the embodiment according to Figs. 11 to 13 the one leg 71 has an aperture 75 through which a mushroom locking element 76 is plugged-in which is locked on the pin 15. The head 77 of said locking element covers the aperture 14 on the back of the main yoke. The embodiment according to Figs. 14 to 16 substantially corresponds to that of Fig. 5 to 7.

In the embodiment according to Figs. 17 to 19 the one leg 71 has two laterally projecting flanges 80 and 81 with embossed detents 82. A locking element 83 engages the pin 15 from the underside thereof relative to the one leg. Said locking element has saw-toothed locking studs 84 co-operating with the detents 82, thus the one leg 71 is locked relative to the pin 15.

In the embodiment according to Figs. 20 to 22 a conventional two-legged locking spring 90 serves as locking element, whereby leg 91 bent in a hook-shaped manner may be locked with said locking spring. A locking lug 92 gripping below the back of the main yoke provides that said locking element together with the connecting element is unmovably held on the main yoke.

The arrangement of the majority of the wiper arm below the plane extending through the pivot pin axis as in Figs. 1 to 4 has proved to be especially advantageous. It is indeed a decisive factor for the effectiveness of the wiper that during the wiping process the wiper blade is standing on the surface to be cleaned as vertically as possible, so that the edge of the wiper lip wipes over the pane at an angle of about 45°. With the wiper blades centrally secured to the wiper arm between the side walls of the main yoke this could not previously be realised so easily, because it has to be considered that due to the driving force of the wiper arm and due to the friction force counteracting against said driving force due to the contact pressure between wiper lip and pane a pitching moment is acting on the joint connection in a way that the wiper blade is tilted. To said pitching moment a twisting moment is opposed, if the wiper is not bent upwards from the joint connection, but downwards. Thereby the effect is the larger the lower the wiper arm is located which is the reason why it is desirable that the wiper arm extends beside the wiper element. It has, however, to be ensured that the wiper arm cannot touch a curved windscreen.

In the embodiment of Figs. 1 to 4, the connecting element is bent in a sideward and downward direction in a way that the wiper arm is extending preferably below the imagined plane through the pivot pin axis in longitudinal direction of the wiper arm.

In the embodiment of Figs. 8 to 10, for example, the connecting element is unmovably locked bet-

ween the side walls of the main yoke and the wiper arm is secured to be swivelled on a profiled pin. By such embodiments it is achieved to secure standard wiper blades, designed for a central fastening on a wiper arm, also to wiper arms of the other above-mentioned type, whereby only a particularly designed connecting element will be needed to realise it.

CLAIMS

1. A windscreen wiper including a wiper arm, a wiper blade with a main yoke and a connecting element between the wiper arm and the wiper blade, the yoke having a substantially U-shaped cross-section and a first pin, secured between sidewalls thereof in the vicinity of an aperture in the back of the main yoke, to which a connecting element for a wiper arm is mounted, characterised in that the connecting element projects through the aperture in the back of the main yoke and has an adapter member for the wiper arm arranged laterally beside the first pin.

2. A windscreen wiper as claimed in claim 1, wherein the connecting element is swivellably locked on the first pin and the wiper arm is unmovably locked with the adapter member.

3. A windscreen wiper as claimed in claim 2, wherein the adapter member is symmetrically arranged laterally on the pivot pin.

4. A windscreen wiper as claimed in claim 3, wherein the adapter member has a wiper arm insertion channel open to both ends and aligned in the longitudinal direction of the wiper blade for a wiper arm with a straight end, one channel wall having a cam engaging a recess in the wiper arm in order to lock the adapter member with the wiper arm.

5. A windscreen wiper as claimed in claim 4, wherein the wiper arm has an embossed projection and the insertion channel at both ends is provided with an insertion limiting stop, one of which stops co-operates with said projection.

6. A windscreen wiper as claimed in claim 1, wherein the connecting element is made in two pieces and consists of a plastics member adapted to be swivellably locked on the first pin and the metal yoke adapted to be slipped over and laterally locked on said plastics member and having a portion for projecting over one side wall of the main yoke and ending in the adapter member.

7. A windscreen wiper as claimed in claim 1, wherein the connecting element is unmovably locked between the side walls of the main yoke and the wiper arm is mounted to be swivelled on the adapter member which is designed as a profiled pin.

8. A windscreen wiper as claimed in claim 7, wherein the connecting element is angled and has one leg which rests upon at least one surface of the side walls of the main yoke and another leg which is provided with the profiled pin, and wherein a locking element is connected between the first leg and the first pin.

9. A windscreen wiper as claimed in claim 8, wherein the locking element is a S-shaped spring which on the one hand is hung on the first pin and on the other hand on a web of the connecting element.

10. A windscreen wiper as claimed in claim 8, wherein the connecting element's one leg has an

aperture through which the locking element is inserted, the locking element having legs formed like a clip which embrace the first pin.

11. A windscreen wiper as claimed in claim 8,
5 wherein the one leg of the connecting element has two laterally projecting flanges each with an embossed detent, which detents co-operate with corresponding saw-toothed locking studs of the locking element, and which locking element engages on the
10 first pin from the underside thereof relative to the one leg of the connecting element.

12. A windscreen wiper as claimed in claim 8, wherein the one leg of the connecting element has two laterally projecting flanges each with a recess
15 with which detents of the locking element locked with the first pin engage.

13. A windscreen wiper as claimed in claim 8, wherein the end of the wiper arm is hook-shaped and a two-legged locking spring serves as the locking element, the one leg of the connecting element
20 being bent in a hook-shaped manner and locked with the locking spring.

14. A windscreen wiper substantially as herein described with reference to and as illustrated in Figs.
25 1 to 4, Figs. 5 to 7, Figs. 8 to 10, Figs. 11 to 13, Figs. 14 to 16, Figs. 17 to 19, or Figs. 20 to 22 of the accompanying drawings.

New claims or amendments to claims filed on 2 Feb.
30 1982 and 29 July 1982.

Superseded claims: 1-14.

CLAIMS

35 1. A windscreen wiper including a wiper arm, a wiper blade with a main yoke and a connecting element between the wiper arm and the wiper blade, the yoke having a substantially U-shaped cross-section and a first pin, secured between sidewalls
40 thereof in the vicinity of an aperture in the back of the main yoke, to which the connecting element for the wiper arm is mounted, wherein the connecting element, or means for mounting the connecting element to the first pin, projects through the aper-
45 ture in the back of the main yoke and wherein the connecting element has an adapter member for the wiper arm arranged laterally beside the first pin, the adapter member comprising a profiled pin.

2. A windscreen wiper as claimed in claim 1,
50 wherein the adapter member is symmetrically arranged laterally of the pivot pin.

3. A windscreen wiper as claimed in claim 1, wherein the connecting element is unmovably locked between the side walls of the main yoke and
55 the wiper arm is mounted to be swivelled on the profiled pin.

4. A windscreen wiper as claimed in claim 3, wherein the connecting element is angled and has one leg which rests upon at least one surface of the
60 side walls of the main yoke and another leg which is provided with the profiled pin, and wherein a locking element comprising the mounting means is connected between the first leg and the first pin.

5. A windscreen wiper as claimed in claim 4,
65 wherein the locking element is a S-shaped spring

which on the one hand is hung on the first pin and on the other hand on a web of the connecting element.

6. A windscreen wiper as claimed in claim 4,
70 wherein the connecting element's one leg has an aperture through which the locking element is inserted, the locking element having legs formed like a clip which embraces the first pin.

7. A windscreen wiper as claimed in claim 4, wherein the one leg of the connecting element has
75 two laterally projecting flanges each with an embossed detent, which detents co-operate with corresponding saw-toothed locking studs of the locking element, and which locking element engages on the first pin from the underside thereof relative to the
80 one leg of the connecting element.

8. A windscreen wiper as claimed in claim 4, wherein the one leg of the connecting element has two laterally projecting flanges each with a recess
85 with which detents of the locking element locked with the first pin engage.

9. A windscreen wiper as claimed in claim 8, wherein the locking element comprises a plastics element and the connecting element comprises a metal yoke.

10. A windscreen wiper as claimed in claim 4,
90 wherein a two-legged locking spring serves as the locking element, the one leg of the connecting element being bent in a hook-shaped manner and locked with the locking spring.

11. A windscreen wiper substantially as herein described with reference to and as illustrated in Figs.
1 to 3, Figs. 4 to 6, Figs. 7 to 9, Figs. 10 to 12, or Figs.
13 to 15 of the accompanying drawings.

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